UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET - SUITE 500
DENVER, CO 80202-2466

JUN 9 1999

Ref: 8P-W-GW

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Deanna Bell
Operations Coordinator
Petroglyph Operating Company, Inc.
4116 W. 3000 S
P. O. Box 607
Roosevelt, UT 84066

66 Modification - Minor Mod Approved
81 Add Well to Area Permit

RE: **UIC PERMIT AUTHORIZATION for Conversion of Additional Well to**
Antelope Creek Waterflood
EPA Area Permit UT2736-00000
Duchesne County, Utah

Dear Ms. Bell:

Your request of September 24, 1998, that the following production well be converted to a Class II enhanced oil recovery well and added to the Antelope Creek Waterflood, as authorized under EPA Area Permit #UT2736-00000 and under the provisions of 40 CFR Part 144.33 has been reviewed. The additional well is described as:

NAME	LOCATION	EPA WELL PERMIT NO.
Ute Tribal #20-13	*SW SW Section 20 T 5 S - R 3 W Duchesne County, UT*	*#UT2736-04494*

This additional well is within the boundary of the existing area permit for the Antelope Creek Waterflood (UT2736-00000) and this addition is made according to the terms and conditions of that permit, unless specifically detailed below. The information provided with your request, The proposed well location, well schematic, conversion procedures with/schematic, plugging and abandonment plan with/schematic, Cement Bond Log (CBL), and Financial Responsibility Demonstration, have been reviewed and approved as follows:

UNDERGROUND SOURCES OF DRINKING WATER (USDWs): The base of the USDWs in the Ute Tribal #20-13 is approximately 1,280 feet below ground level and is located within the Uinta Formation. The source for this USDW information is formation water analyses submitted by the operator for twenty-two (22) wells within the initial AOR, and information from Publication No. 92 (1987), prepared jointly by the USGS and the Utah Division of Oil, Gas, and Mining.

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66 Modif
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RE: **UIC PERM**
Conversi
Antelope
EPA Area
Duchesne

Scan under
UT 20736-00000 under
permit activity 66
"Modification - minor mod
Approved" 6/9/1999.
Will need to link with
UT 20736-04494 in
new database under
permit activity 81
"Add Well to Area Permit"

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CONFINING ZONE: The overall confining strata above the top perforated injection zones (4,416 feet) to 1,280 feet (base of Uinta Formation) consist of impermeable Upper Green River Formation calcareous shales and continuous beds of microcrystalline dolomite, and is considered adequate to limit fluid movement above the injection zone.

PART II.

A. Well Conversion/Construction Requirements

1. Casing and Cementing. The proposed conversion plan for this production well, submitted with this application, is hereby approved by the Director. (See enclosed conversion schematic and workover procedure).

2. Requirements for Additional Wells.

(a) Surface Casing: 8-5/8 inch casing is set at 283 feet in a 12-1/4 inch hole using 165 sacks of cement and cemented to the surface.

(b) Production Casing: 5-1/2 inch casing is set at 6136 feet in a 7-7/8 inch hole, cemented with 485 sacks cement. Top of cement is estimated at 2450 feet by cement bond log (CBL). Top of perforated interval is 4416 feet.

(c) Formation Logging and Testing: Upon conversion of the Ute Tribal #20-13 the permittee is required to determine and submit to the EPA the **injection zone fluid pore pressure (static bottom hole pressure)** prior to commencement of enhanced recovery injection operations.

~~(d) Area of Review (AOR) Within the 1/4 mile~~ area of review there are three (3) production wells. The annulus cement ranges from 1380 to 2634 feet above the top perforations and is so located as to confine the injectate to the authorized interval. No remedial action is required for these wells.

(3) Tubing and Packer: The injection well will be equipped with 2-3/8 inch tubing, with a packer set 4340 feet.

PART II.

A. CORRECTIVE ACTION

The operator is not required to take any corrective action on any of the three (3) production wells within the AOR. The manner in which the wells are cased and cemented (annulus cement ranges from 1380 to 2634 feet above the top perforations) will prevent any migration of fluids from the injection zones into USDWs in the Uinta Formation (base at 1280 feet). If, as a result of injection into the Ute Tribal #20-13, upward fluid migration occurs behind the casings of any wells "serviced" by the Ute Tribal #20-13, injection into that/those well(s) shall immediately halt. No further injection will be allowed until the proper remedial work has been performed, and has been approved by the EPA. Any such flowage will be considered as noncompliance with the Area Permit.

B. WELL OPERATION

2. Prior to Commencing Injection (Additional Wells). **Prior to commencing injection into this well,** permittee must fulfill permit condition Part II, C. 2. and have submitted to the EPA, for review and approval, the following:

   (a) All conversion is complete and the permittee has submitted a completed **Well Rework Record (EPA Form 7520-12)** or **Well Completion Report (EPA Form 7520-10)** with after conversion wellbore diagram; and,

   (b) the **injection zone pore pressure has been determined; and,**

   (c) the well has successfully completed and passed a **mechanical integrity test (MIT), with pressure chart (MIT Guidance enclosed).**

4. Injection Interval. Fluid injection shall be limited to the gross interval within the Green River Formation between the approximate depths of 4,416 to 5,938 feet. Petroglyph proposes to inject water into multiple lenticular sands which are distributed throughout a 1,522 foot section of the Green River Formation. These sands are individually separated by shales which act as isolated barriers (confining zones) for the waterflood sections.

5. Injection Pressure Limitation. **Maximum injection pressure (Pmax)** - the permittee shall limit the maximum surface injection pressure (Pmax) to **1974 psig. The operator may request an increase or decrease in the injection pressure based on valid step rate test (SRT) data and or other parameters reflecting actual injection operations, pursuant to Part II, Section C. 5. of the original permit.**

The calculations for the fracture gradient was estimated from instantaneous shut-in pressures (ISIP's) observed during fracturing treatments performed on individually fractured zones within the four (4) initial wells establishing the Antelope Creek Field Area Permit. Based on this information, an initial maximum injection pressure, using 0.88 psi/ft fracture gradient (Fg) has been established for this area permit and wells. This Fg is acceptable and the initial maximum allowable surface injection pressure (Pmax) for this well has been determined as shown below:

Pmax = [Fg - 0.433 (Sg)] d

Where: Pmax = Maximum surface injection pressure at wellhead

d = 4416' shallowest perforations after conversion

Sg = Specific gravity of injected water

Pmax = [0.88 - .433 (1.00)] 4416

Pmax = 1974 psig

E. Plugging and Abandonment. The plugging and abandonment plan and schematic (see enclosed plugging and abandonment procedure and schematic), ~~submitted with this application, has been~~ reviewed and approved. The EPA reserves the right to change the manner in which the well will be plugged if the well is not made consistent with EPA requirements for construction and mechanical integrity.

F. Financial Responsibility.
The operator has chosen to demonstrate financial responsibility through a Surety Performance Bond in the amount of $15,000 per well, as amended and submitted by Bond Rider NO. 13., signed sealed and dated the 25th day of September, 1998.

Please be aware that Petroglyph will not have authorization to begin injection into the Ute Tribal #20-13 until the items listed above have been approved by the EPA and Petroglyph has received **written authorization** to begin injection from the EPA.

All other provisions and conditions of Area Permit UT2736-00000 remain as originally issued July 12, 1994, and modified April 30, 1998.

If you have any questions, please contact Mr. Chuck Williams at 303-312-6625. Also, please direct the above requirements to Mr. Williams at the above letterhead address, citing **MAIL CODE 8P-W-GW**. Thank you for your continued cooperation.

Sincerely,

for Kerrigan G. Clough
Assistant Regional Administrator
Office of Partnerships and
Regulatory Assistance

Enclosures: Before Conversion Schematic
Guidance for Conducting a Pressure Test to Determine if a Well Has Leaks in the Tubing, Casing or Packer
Plugging and Abandonment Schematic

cc: Mr. Ronald Wopsock, Chairman
Ute Indian Tribe

Ms. Elaine Willie, Environmental Director
Ute Indian Tribe

Norman Cambridge
BIA - Uintah & Ouray Agency

Mr. Jerry Kenczka
BLM - Vernal District Office

Mr. Gilbert Hunt
State of Utah Natural Resources
Division of Oil, Gas & Mining

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- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
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JUN 10 1999

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Consult postmaster for fee.

3. Article Addressed to:

Ms. Deanna Bell
Operations Coordinator
Petroglyph Operating Company, Inc.
P.O. Box 607
Roosevelt, UT 84066

4a. Article Number
P 380 306 181

4b. Service Type
☐ Registered ● Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

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6-14-99

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6. Signature: *(Addressee or Agent)*
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JUN 25 1999

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Certified Fee	
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Postmark or Date	

PS Form **3800**, April 1995